An Overview of the Cisco Wireless IP Phone 7920

The Cisco Wireless IP Phone 7920 provides wireless voice communication over an Internet Protocol (IP) network. Like traditional analog telephones, you can place and receive phone calls and access features such as mute, hold, transfer, and speed dial. In addition, because the phone connects to your wireless LAN, you can place and receive phone calls from anywhere in your wireless environment. You can also change IP telephony features through your data network.

This manual describes the Cisco Wireless IP Phone 7920 that provides 802.11b wireless voice communications in conjunction with Cisco CallManager and Cisco Aironet 802.11b Access Points (APs). This phone model supports G.711a, G.711u, and G.729a audio compression coder-decoders (codecs). You must configure and manage a Cisco Wireless IP Phone like other wireless network devices.

This chapter includes the following topics:

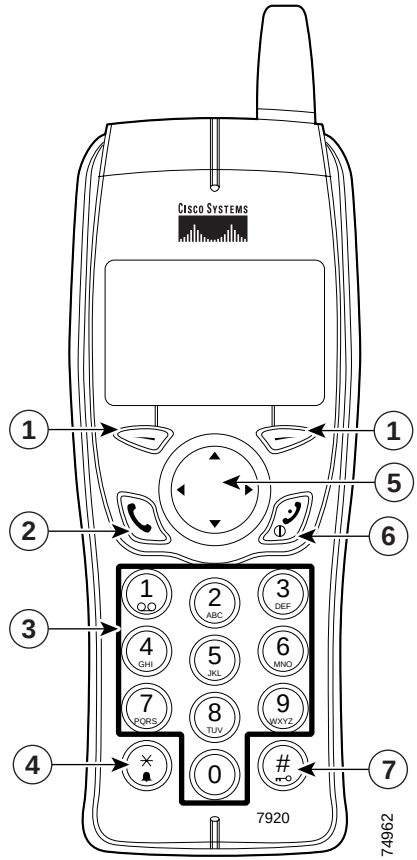
- Understanding the Cisco Wireless IP Phone 7920, page 1-2
- Understanding the Voice Wireless Network, page 1-4
- Networking Protocols Used with Cisco Wireless IP Phones, page 1-7
- Features Supported on the Cisco Wireless IP Phone 7920, page 1-10
- Understanding the Requirements for Installing and Configuring the Cisco Wireless IP Phone 7920, page 1-13

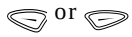
Understanding the Cisco Wireless IP Phone 7920

The Cisco Wireless IP Phone 7920 is an 802.11b wireless IP phone that provides comprehensive voice communications in conjunction with Cisco CallManager and Cisco Aironet 802.11b Access Points (APs) in a private business communications network.

Figure 1-1 shows the Cisco Wireless IP Phone 7920. The callout table describes the functions of the keys on the phone.

Figure 1-1 Cisco IP Phone 7920 Keys



1		Left or Right softkey—Activates the item in the label above the softkey.
2		Answer/Send key—Answers a call or dials a number.
3		Number keys (0-9)—Use these to enter numbers and characters. Number keys (2-9)—Use these to activate Speed Dial hot keys.
4		Asterisk (*) key—Toggles between ring and vibrate mode. When you enter characters, toggles between upper and lower case. Refer to the *Cisco Wireless IP Phone 7920 Guide*.
5		Arrow keys—Moves from one function to another. This guide uses these directional arrows ▲, ▼, ◀, or ▶.
6		Power/End key—Turns the phone on or off, silences a ringing call, or ends a connected call.
7		Pound (#) key—Toggles between locking and unlocking the key pad. Allows you to access special characters when you are entering text.

Related Topics

- Understanding the Voice Wireless Network, page 1-4
- Networking Protocols Used with Cisco Wireless IP Phones, page 1-7
- Features Supported on the Cisco Wireless IP Phone 7920, page 1-10
- Understanding the Requirements for Installing and Configuring the Cisco Wireless IP Phone 7920, page 1-13

Understanding the Voice Wireless Network

Voice over IP (VoIP) telephones use a hard-wired connection to the network for transmitting call control messages and voice packets. With the introduction of wireless communication, mobile wireless IP phones provide similar communication features within the corporate wireless local area network (WLAN). Use the following topics to understand your voice wireless network:

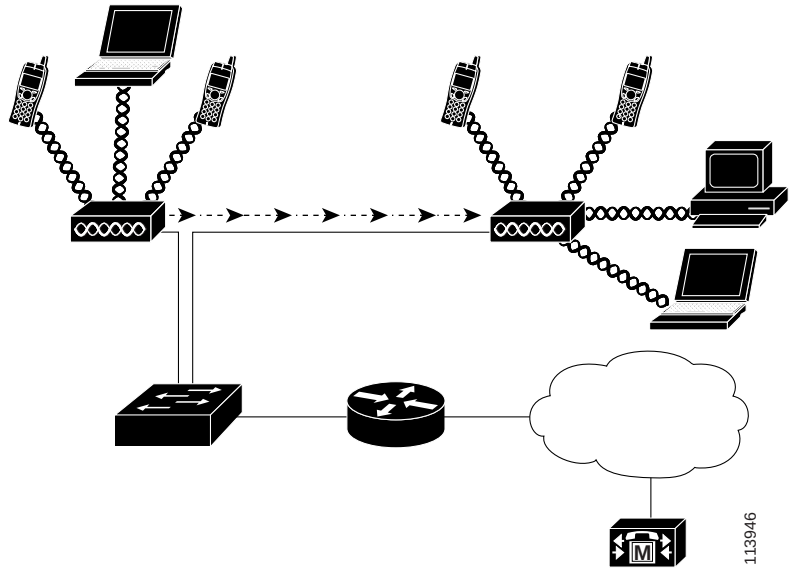
- Overview of a Wireless LAN, page 1-4
- The 802.11 Standard for Wireless LAN Communications, page 1-5
- Wireless Access Points, page 1-6
- Security, page 1-7

Overview of a Wireless LAN

In a traditional LAN, phones and computers use cables to transmit messages and data packets over a wire conductor. Wireless LANs use radio waves to carry the messages and data packets. WLANs require access points that receive and transmit radio signals. Cisco Aironet series access points including the 1200, 1100, and 350 series models support voice on a WLAN. Figure 1-2 shows a typical WLAN topology that incorporates both wireless data with laptop computers and wireless IP telephony (WIPT) with Cisco Wireless IP Phone 7920.

When a wireless device powers on, it immediately searches for and becomes associated with an access point. As users move from one location to another within the corporate WLAN environment, the wireless device roams out of range of one access point and into the range of another. Data and voice calls are transmitted from the access point to the switch and router by using the wired, Ethernet network. Phone calls are sent to the Cisco CallManager server for call processing and routing.

Figure 1-2 Wireless LAN with Cisco Wireless IP Phone 7920s



The 802.11 Standard for Wireless LAN Communications

Wireless LANs must follow the Institute of Electrical and Electronics Engineers (IEEE) 802.11 standards that define the protocols that govern all Ethernet-based wireless traffic. The 802.11b sub-standard is the most prevalent standard in wireless LAN communications and is commonly called WiFi. The 802.11b standard specifies the radio frequency (RF) of 2.4 GHz for both transmitting and receiving data at speeds of 1, 2, 5.5 and 11 Mbps.

The 2.4 GHz RF range is an open frequency range that does not require licensing. Many devices operate in this bandwidth including cordless phones and microwave ovens; consequently, wireless communication is susceptible to interference or noise. Interference does not destroy the signal, but can impede the transmission speed and reduce an 11 Mbps signal down to a 1Mbps signal. In addition, RF interference can reduce the voice quality over the wireless network. To help prevent interference, direct-sequence spread spectrum (DSSS) technology was developed to spread the signal out over the frequency range or bandwidth. DSSS technology multiplexes chunks of data over several frequencies so that multiple

devices can communicate without interference. Each device has a special code that it uses to identify its data packets and to ignore all others. The Cisco wireless products use DSSS technology to support multiple devices on the WLAN.

Wireless Access Points

The critical components in the wireless network are the access points (APs) that provide the “hot spots” or wireless links to the network. Cisco requires that Cisco IOS is running on the APs that support voice calls since Cisco IOS provides features for managing voice traffic. The minimum version of IOS you can use is 12.2(15)JA. The Cisco Aironet APs that support IOS include the following AP series:

- Cisco Aironet AP 350
- Cisco Aironet AP 1100
- Cisco Aironet AP 1200

Each AP has a hard-wired connection to a network layer switch, such as a Cisco Catalyst 4000, that is configured on the LAN. The switch provides access to gateways and the Cisco CallManager server to support wireless IP telephone (WIPT).

APs transmit and receive RF signals over channels within the 2.4 GHz frequency band. Regulatory domains determine the number of channels that wireless communications can use within the 2.4 GHz frequency band. The Cisco Aironet APs support up to 11 communication channels in North America, 13 channels in Europe (ETSI) and 14 channels in Japan. An access point broadcasts on a specific channel within the available channel range. To provide a stable wireless environment and reduce channel interference, you must specify non-overlapping channels for each AP. The recommended channels are 1, 6, and 11.

The AP has a transmission range or coverage area that depends on its type of antenna and transmission power. The access point coverage range is from 500 to 1000 feet with effective isotropic radiated power (EIRP) output that scales at 1, 5, 20, 50, and 100mW. To provide effective coverage, access points need a range overlap of approximately 20 percent to allow uninterrupted connections as phone users roam from one access point to another.

Wireless network devices use a service set identifier (SSID).The SSID provides a way to group a set of user devices that can associate with a set of access points. Each wireless device that can use the access point is configured with the same SSID as the AP.

Security

All wireless LAN traffic is seen by all other WLAN devices that are within range, so securing voice communications is important. To ensure that voice traffic is not manipulated or intercepted by intruders, the Cisco Wireless IP Phone 7920 and Aironet APs are supported in the overall Cisco SAFE security architecture.

The Cisco Wireless IP Telephony solution provides the following additional security areas:

- Network access security to prevent unauthorized logins by using encryption and authentication with wireless encryption protocol (WEP) and Cisco Light Extensible Authentication Protocol (LEAP) and the elimination of rogue APs.
- Password protection for directories and databases including a Cisco Wireless IP Phone 7920 phone lock password.

Related Topics

- Networking Protocols Used with Cisco Wireless IP Phones, page 1-7
- Understanding the Cisco Wireless IP Phone 7920, page 1-2
- Features Supported on the Cisco Wireless IP Phone 7920, page 1-10

Networking Protocols Used with Cisco Wireless IP Phones

Cisco IP Phones support several industry-standard and Cisco networking protocols for voice communication. Table 1-1 provides an overview of the networking protocols that the Cisco Wireless IP Phone 7920 supports.

Table 1-1 Supported Networking Protocols on the Cisco Wireless IP Phone

Networking Protocol	Purpose	Usage Notes
Wi-Fi (802.11b)	802.11 is an open standard that defines wireless methods of transmitting Ethernet traffic and is commonly called Wi-Fi. This standard defines for radio frequencies (RF) and data speed for wireless LAN communications.	Cisco Wireless IP Phone 7920 uses the 802.11b standard with a range of 2.4-2.497 GHz RF and dynamic rate scaling of 1, 2, 5.5, and 11Mbps speeds.
Cisco Discovery Protocol (CDP)	CDP is a device-discovery protocol that runs on all Cisco-manufactured equipment. Using CDP, a device can advertise its existence to other devices and receive information about other devices in the network.	The Cisco IP Phone uses CDP to communicate information such as auxiliary VLAN ID, per-port power management details, and Quality of Service (QoS) configuration information with the Cisco Catalyst switch.
Dynamic Host Configuration Protocol (DHCP)	DHCP dynamically allocates and assigns an IP address to network devices. DHCP enables you to connect an IP phone into the network and have the phone become operational without you needing to manually assign an IP address or configure additional network parameters.	DHCP is enabled by default. If disabled, you must manually configure the IP address, subnet mask, gateway, and an TFTP server on each phone locally. Cisco recommends that you use DHCP custom option 150. With this method, you configure the TFTP server IP address as the option value. For additional supported DCHP configurations, refer to *Cisco CallManager System Guide*.

Table 1-1 Supported Networking Protocols on the Cisco Wireless IP Phone (continued)

Networking Protocol	Purpose	Usage Notes
Internet Protocol (IP)	IP is a messaging protocol that addresses and sends packets across the network.	To communicate using IP, network devices must have an assigned IP address, subnet, and gateway. IP addresses, subnets, and gateways identifications are automatically assigned if you are using the Cisco IP Phone with Dynamic Host Configuration Protocol (DHCP). If you are not using DHCP, you must manually assign these properties to each phone locally.
Real-Time Transport (RTP)	RTP is a standard for transporting real-time data, such as interactive voice and video, over data networks.	Cisco IP Phones use the RTP protocol to send and receive real-time voice traffic from other phones and gateways.
Transmission Control Protocol (TCP)	TCP is a a connection-oriented transport protocol.	Cisco IP Phones use TCP to connect to Cisco CallManager and to access XML services.
Trivial File Transfer Protocol (TFTP)	TFTP allows you to transfer files over the network. On the Cisco IP Phone, TFTP enables you to obtain a configuration file specific to the phone type.	TFTP requires a TFTP server in your network, which can be automatically identified from the DHCP server. If more than one TFTP server is running in your network, you must manually assign a TFTP server to each phone locally.
User Datagram Protocol (UDP)	UDP is a connectionless messaging protocol for delivery of data packets.	Cisco IP Phones receive and process UDP messages.

Related Topics

- Understanding the Phone Startup Process, page 2-9
- Interactions with Components in the VoIP Network, page 2-1
- Modifying DHCP Settings, page 5-7

- Configuring TFTP Options, page 5-13
- Configuring TFTP Options, page 5-13

Features Supported on the Cisco Wireless IP Phone 7920

The Cisco Wireless IP Phone 7920 functions much like a traditional analog phone, allowing you to place and receive telephone calls. In addition to traditional telephony features, the Cisco IP Phone includes features that enable you to administer and monitor the phone as a network device.

This section includes the following topics:

- Feature Overview, page 1-10
- Configuring Telephony Features, page 1-11
- Configuring Network Features for the Cisco Wireless IP Phone, page 1-12
- Providing Users with Feature Information, page 1-12

Feature Overview

Cisco Wireless IP Phone 7920 provides traditional telephony functionality, such as call forwarding and transferring, call pickup, redialing, speed dialing, conference calling, and voice messaging system access. In addition, the Cisco Wireless IP Phone 7920 provides the following features:

- Wireless access to your corporate phone extension and phone services.
- Multiline appearances
- Up to eight speed dial hot keys
- Caller ID for incoming calls
- Softkey access to menus and your personal phone book
- Choice of profiles for the personal user

Like other network devices, you must configure the Cisco Wireless IP Phones to prepare them to access Cisco CallManager and the rest of the IP network. See the "Configuring Network Features for the Cisco Wireless IP Phone" section on

page 1-12 for more information about configuration options. Because the Cisco IP Phone is a network device, you can obtain detailed status information about it. This information can assist you in troubleshooting problems that users might encounter when using their IP phones. See Chapter 8, "Viewing Status, Statistics, and Firmware Information on the Cisco Wireless IP Phone 7920," for tips on using this information.

Related Topics

- Configuring Network Settings on the Cisco Wireless IP Phone 7920, page 5-1
- Configuring Features and Users, page 7-1
- Troubleshooting the Cisco Wireless IP Phone 7920, page 9-1

Configuring Telephony Features

You can modify additional settings on the Cisco IP Phone from the Cisco CallManager Administration application. Use this web-based application to set up phone registration criteria and calling search spaces, and to modify softkey templates, among other tasks. For more information, see Chapter 7, "Configuring Features and Users."

In some places, this manual provides partial instructions for procedures that involve Cisco CallManager Administration. These instructions are intended to point you to the appropriate page in the Cisco CallManager application and to provide some initial guidance.

For more information about the Cisco CallManager Administration application, refer to Cisco CallManager documentation, including *Cisco CallManager Administration Guide*. You can also use the context-sensitive help that is available within the application. Access context-sensitive help by choosing **Help > For this screen** from the main menu bar.

You can access the complete Cisco CallManager documentation suite at this location:

http://www.cisco.com/univercd/cc/td/doc/product/voice/c_callmg/index.htm

Related Topic

- Configuring Telephony Features Using Cisco CallManager Administration, page 7-2

Configuring Network Features for the Cisco Wireless IP Phone

There are two methods for configuring network features such as DHCP, TFTP, and IP settings and wireless settings for the phone.

- Cisco 7920 Configuration Utility
- Network Config menu on the Cisco Wireless IP Phone 7920

You can use the Cisco 7920 Configuration Utility on a personal computer and connect to the Cisco Wireless IP Phone 7920 with a USB cable to configure phone and network settings. For more information, see Chapter 4, “Using the Cisco 7920 Configuration Utility.”

You can also configure network settings on the phone itself. For more information about configuring features from the phone, see Chapter 5, “Configuring Network Settings on the Cisco Wireless IP Phone 7920” and see Chapter 6, “Configuring the Wireless Network Settings on the Cisco Wireless IP Phone 7920.”

Related Topics

- Using the Cisco 7920 Configuration Utility, page 4-1
- Configuring Network Settings on the Cisco Wireless IP Phone 7920, page 5-1
- Configuring the Wireless Network Settings on the Cisco Wireless IP Phone 7920, page 6-1

Providing Users with Feature Information

If you are a system administrator, you are likely the primary source of information for Cisco IP Phone users in your network or company. To ensure that you distribute the most current feature and procedural information, familiarize yourself with Cisco IP Phone documentation. Make sure to visit the Cisco IP Phone web site:

http://www.cisco.com/univercd/cc/td/doc/product/voice/c_ipphon/index.htm

From this site, you can view and order additional phone documentation. For complete ordering information, see the “Obtaining Documentation” section on page xvi .

In addition to providing documentation, it is important to inform users about available Cisco IP Phone features—including features specific to your company or network—and about how to access and customize those features, if appropriate.

For a summary the key information that the system administrator can provide to phone users, see Appendix A, "Providing Information to Users Via a Website."

Related Topics

- Understanding the Requirements for Installing and Configuring the Cisco Wireless IP Phone 7920, page 1-13
- Providing Information to Users Via a Website, page A-1

Understanding the Requirements for Installing and Configuring the Cisco Wireless IP Phone 7920

To install and configure the Cisco Wireless IP Phone, you must configure some network settings, set up Cisco CallManager, and make changes locally on the phone.

See Table 1-2 for an overview of required procedures. For detailed information about these procedures, refer to the sources shown.

Table 1-2 Overview of Configuration Procedures for the Cisco Wireless IP Phone

Required Task	Purpose	For More Information
1. Gather the following information about the phone for use in Cisco CallManager Administration: • Information requested in the Device Information fields, if applicable, such as the device pool and calling search space. • The Cisco CallManager user to associate with the phone. • The number of lines and associated directory numbers to assign to the phone • Features to be added and configured for the phone.	You will refer to this information when using the Cisco CallManager Administration Phone Configuration web page to configure a phone. The Device Information fields on this page will auto-populate if information is relevant and available. Edit fields if you want to override system settings on a per-device basis.	See the "Adding Phones to the Cisco CallManager Database" section on page 2-13. See the "Configuring Telephony Features Using Cisco CallManager Administration" section on page 7-2. Refer to *Cisco CallManager System Guide*. Refer to *Cisco CallManager Administration Guide*.
2. Configure routers, gateways, and switches to handle voice communication.	Establishes the infrastructure for the IP telephony network.	See the "Interactions with Components in the VoIP Network" section on page 2-1 and the documentation included with these devices.
3. Perform a site survey to determine where to place and install access points (APs) for wireless voice coverage	Identifies areas where RF signal coverage is required. Determines high usage areas (conference rooms), areas with RF interference (labs, equipment rooms), and areas not covered for wireless data (stairwells, elevators, breezeways)	Refer to the *Wireless 7920 Design and Deployment Guide*

Table 1-2 Overview of Configuration Procedures for the Cisco Wireless IP Phone (continued)

Required Task	Purpose	For More Information
4. Install and Configure Cisco Aironet Access Points to handle wireless communications for phones.	Establishes the coverage, channels, signal strength, and authentication for the wireless voice network.	Refer to the *Wireless 7920 Design and Deployment Guide*
5. Decide how you want to add phones to the Cisco CallManager database: • With auto-registration • With Cisco CallManager Administration only • With the Bulk Administration Tool (BAT) only • With BAT and the Tool for Auto-Registered Phones Support (TAPS)	How you add the phones to Cisco CallManager determines how the directory number is assigned and whether you need to obtain a MAC address first, among other things.	See the "Adding Phones to the Cisco CallManager Database" section on page 2-13. Refer to *Cisco CallManager Administration Guide*. Refer to *Bulk Administration Tool User Guide for Cisco CallManager*.
6. Obtain the MAC address from the IP phone.	Not necessary if you plan to add phones to the Cisco CallManager database using auto-registration only or in conjunction with the Tool for Auto-Registered Phones Support (TAPS).	See the "Determining the MAC Address of a Cisco IP Phone" section on page 2-13.
7. Configure network settings and phone settings on the Cisco Wireless IP Phone or by using the Configuration Utility.	Sets system parameters such as IP settings (if not using DHCP in the network) and assigns a TFTP server. Also sets phone settings such as ring tone and phone lock password.	See the "Configuring Network Settings on the Cisco Wireless IP Phone 7920" section on page 5-1 See the "Using the Cisco 7920 Configuration Utility" section on page 4-1.

Table 1-2 Overview of Configuration Procedures for the Cisco Wireless IP Phone (continued)

Required Task	Purpose	For More Information
8. Configure wireless network settings on the Cisco Wireless IP Phone or by using the Configuration Utility.	Sets SSID, authentication type, and transmission rate and power for the phone.	See the "Configuring the Wireless Network Settings on the Cisco Wireless IP Phone 7920" section on page 6-1 See the "Using the Cisco 7920 Configuration Utility" section on page 4-1.
9. Configure the phone features such as call waiting, call forward, call park, and call pickup.	Provides enhanced telephony functionality.	See the "Configuring Telephony Features Using Cisco CallManager Administration" section on page 7-2 Refer to *Cisco CallManager Administration Guide*.
10. Add users to Cisco CallManager.	Associates a user with a phone, enabling access to the User Options web-based application where users set up features such as call forwarding and speed dial, and subscribe to services.	See the "Adding Users to Cisco CallManager" section on page 7-6. Refer to *Cisco CallManager Administration Guide*.
11. Power on the Cisco Wireless IP Phone to test that it connects to the network.	Ensures that the phone communicates with the access point and Cisco CallManager.	See the Understanding the Phone Startup Process, page 2-9
12. Provide information to end users about how to use their phones and how to configure their phone options.	Ensures that users have adequate information to successfully use their Cisco IP Phones.	See the Appendix A, "Providing Information to Users Via a Website."

Related Topics

- Understanding the Cisco Wireless IP Phone 7920, page 1-2
- Understanding the Voice Wireless Network, page 1-4
- Networking Protocols Used with Cisco Wireless IP Phones, page 1-7